

Amendment to the Claims:

1. (Currently Amended) A Ppump ~~(1)~~ with comprising:
a housing (2), having an inlet (28) and an outlet (29),
a drive (5),
a fixed cylinder ~~(2) central to~~ with a mid-axis (9),
a displacer (18) rotating eccentrically within the cylinder (2),
a crank drive (13) for the displacer (18),
a circumferential sickle-shaped pumping chamber (26) between the cylinder
~~(2)~~ and displacer (18), and
a helical sealing element ~~(27, 27', 27'', 39)~~ in the pumping chamber (26),
wherein
the pump is embodied as being a dry vacuum pump, whereby the displacer
~~(18)~~ circulates in the cylinder (2) without making contact.
2. (Currently Amended) Pump The pump according to claim 1, wherein the
smallest distance between the displacer (18) and an inside cylinder wall of the
cylinder does not exceed 1 mm, preferably 0.2 mm.
3. (Currently Amended) Pump The pump according to claim 1 or 2, wherein the
cylinder (2) is a component of the pump housing.
4. (Currently Amended) Pump The pump according to claim 1, 2 or 3, wherein
the displacer (18) ~~exhibits~~ defines a hollow space (20).

5. (Currently Amended) ~~Pump~~ The pump according to claim 4, wherein a cooling gas flows through the hollow space (20).
6. (Currently Amended) ~~Pump~~ The pump according to ~~one of the claims 1 to 5~~, wherein means (21, 45) are provided which prevent turning of the displacer (18) about the mid-axis (9) of the cylinder (2).
7. (Currently Amended) ~~Pump~~ The pump according to ~~one of the claims 1 to 6~~, wherein means (46, 47) are provided which prevent turning of the sealing element about the mid-axis (9) of the cylinder (2).
8. (Currently Amended) ~~Pump~~ The pump according to ~~one of the claims 1 to 7~~, wherein ~~the~~ an outside wall of the displacer (18) is equipped with a helical groove (30) for the sealing element (27).
9. (Currently Amended) ~~Pump~~ The pump according to claim 8, wherein the helical sealing element (27) has, in the relaxed state, an outside diameter which is greater than ~~the~~ an inside is diameter of the cylinder (2).
10. (Currently Amended) ~~Pump~~ The pump according to ~~one of the claims 1 to 7~~, wherein the inside wall of the cylinder (2) is equipped with a helical groove (30) for the sealing element (27).

11. (Currently Amended) ~~Pump~~ The pump according to claim 10, wherein the helical sealing element, (27) in the a relaxed state, has an inside diameter which is smaller than the an outside diameter of the displacer (18).
12. (Currently Amended) ~~Pump~~ The pump according to ~~one of the claims 8 to 11,~~ wherein the sealing element (27) exhibits, in the area of the groove, (30) approximately radially oriented sealing lips (~~73, 74~~).
13. (Currently Amended) ~~Pump~~ The pump according to ~~one of the claims 8 to 12,~~ wherein the sealing element (27) ~~exhibits~~ includes in the area of its unoccupied side face ~~side~~ a substantially axially orientated sealing lip (71).
14. (Currently Amended) ~~Pump~~ The pump according to ~~one of the claims 8 to 13,~~ wherein two or more grooves (30, 30'') are provided ~~according to the type of~~ as a double or multiple thread as well as a corresponding number of sealing elements (27, 27'').
15. (Currently Amended) ~~Pump~~ The pump according to ~~one of the claims 8 to 14,~~ wherein ~~the~~ a pitch of the groove (30, 30', 30'') from the inlet (28) to the outlet (29) decreases at least section-wise.
16. (Currently Amended) ~~Pump~~ The pump according to claim 15, ~~wherein it is equipped with~~ further comprising a relief valve (32) which is located between the inlet (28) and the outlet (29).

17. (Currently Amended) ~~Pump~~ The pump according to ~~one of the claims 1 to 16,~~ wherein further comprising the a rotating rotary system (8) with a crank, the crank (13) is provided being driven by a the drive (5) via a shaft (6), said rotating rotary system with the crank supporting the displacer (18) via bearings (16, 17).
18. (Currently Amended) ~~Pump~~ The pump according to claim 17, wherein the crank includes two crank sections in bearing pieces, one section on each side of the pump housing, and the rotating rotary system (8) is supported, via bearings, through the two crank sections (14, 15) in bearing pieces (3, 4) on both sides of the pump housing (2) sections.
19. (Currently Amended) ~~Pump~~ The pump according to claim 17, wherein one crank section (14) is cantilevered and where the displacer (18) is supported in a cantilevered manner by the crank section (14).
20. (Currently Amended) ~~Pump~~ The pump according to claim 17, ~~18 or 19,~~ wherein at least one mass balancing weight (22) is part of the rotating rotary system (8).
21. (Currently Amended) ~~Pump~~ The pump according to ~~the claims 4 and 20,~~ wherein the displacer includes a hollow space, the mass balancing weight (22) is being located in the a hollow space (20).

22. (Currently Amended) ~~Pump~~ The pump according to ~~one of the claims 1 to 21,~~
wherein it the pump is of a double flow design.
23. (Currently Amended) ~~Pump~~ The pump according to claim 22, wherein ~~it is~~
~~characterised by~~ the inlet is a central inlet (28) and the outlet includes outlets
(29, 29') located on ~~the face sides~~ faces of the housing.
24. (Currently Amended) ~~Pump~~ The pump according to ~~one of the above claim 1s,~~
wherein it the pump is of a two-stage or multi-stage design.
25. (Currently Amended) ~~Pump~~ The pump according to claim 19 and 24, wherein
the displacer (18) substantially has the shape of a double pot⁴⁾ which includes
first and second hollow spaces, and where-in bearings of the displacer are
located in one of the hollow spaces ~~on the face side the bearings (16, 17) of the~~
~~displacer are located~~ and a pumping stage is located ~~where are~~ in the other
hollow space (36) ~~a second pumping stage is located~~.
26. (Currently Amended) ~~Pump~~ The pump according to claim 25, wherein a
component (35) is fixed to the housing and ~~projeeting~~ projects into the hollow
space (36) ~~forms~~ with a cylindrical outer surface that forms, jointly with the an
inside wall of the displacer, (18) a further pumping stage.

⁴⁾ **Translator's note:** The German text states "Doppeltropf" here whereas "Doppeltopf" would be more in line with the drawing figures and the remaining text. Therefore the latter has been assumed for the translation.

27. (Currently Amended) ~~Pump~~ The pump according to claim 26, wherein a bore (60)²⁾-penetrating the component (35) forms the inlet.
28. (Currently Amended) ~~Pump~~ The pump according to ~~one of the claims 24 to 27,~~ wherein the volumes of the pumping chambers in the a stage on the an intake side are greater than the volumes of the pumping chambers of the a pump stage on the a delivery side.
29. (Currently Amended) ~~Pump~~ The pump according to ~~one of the above claims 1,~~ ~~wherein it is equipped with~~ further comprising a gas ballast facility.
30. (Currently Amended) ~~Pump~~ The pump according to claim 29, wherein the housing (2) is equipped with a bore through which ballast gas is supplied via a line (51) equipped with a valve (52).
31. (Currently Amended) ~~Pump~~ The pump according to the claims 4, and 17 further comprising a rotary system, wherein the ~~rotating~~ rotary system (8) is equipped with a system of channels (55) through which the hollow space (20) in the displacer (18) is connected to the surroundings.

²⁾ ~~Translator's note:~~ The German text states "40" here whereas "60" would be more in line with the drawing figures and the remaining text. Therefore the "60" has been assumed for the translation.

32. (Currently Amended) ~~Pump~~ The pump according to ~~the claims 29 31 and 31,~~ wherein the displacer (18) is equipped with a bore (57) and wherein the system of channels (55) serves the purpose of supplying ballast gas.
33. (Currently Amended) ~~Pump~~ The pump according to claim 31, wherein the system of channels (55) serves the purpose of supplying cooling air.
34. (Currently Amended) ~~Pump~~ The pump according to ~~the claims 4, 22 and 33,~~ wherein the displacer includes a hollow space and is equipped with a bore, the system of channels serves the purpose of supplying cooling air, and the outlet is served by a joint discharge bore, it is characterised by a direction of the pumping action of the two pump stages being from their respective side faces of the housing sides to the joint discharge bore (59) whereby one of the pump stages serves the purpose of removing the cooling air from the hollow space (20) of the displacer (18).
35. (Currently Amended) ~~Pump~~ The pump according to ~~one of the above claim 1s~~ wherein the helical sealing element consists of a PTFE containing material and the displacer (18) ~~as well as~~ and the housing (2) consist of an aluminium material.
36. (Currently Amended) ~~Pump~~ The pump according to ~~one of the above claims 1,~~ wherein one of an outside wall of the displacer and an inside wall of the cylinder is equipped with a helical groove for the sealing element and the

rotational speed and eccentricity are so selected that the a sliding velocity between the helical sealing element and the a side wall of the related groove is between 1 and 5 m/s, ~~preferably between 3.5 and 5 m/s.~~

37. (Currently Amended) A mMethod for operating a pump (1) with a housing (2), having an inlet (28) and an outlet (29), a drive (5), a fixed cylinder (2) ~~centraled to~~ on a mid-axis (9), a displacer (18), rotating eccentrically within the cylinder (2), a crank drive (13) for the displacer (18), a circumferential sickle-shaped pumping chamber (26) between the cylinder (2) and displacer (18) and a helical sealing element (27, 27', 27'', 39) in the pumping chamber (26), wherein the method comprising:

operating the pump (1) ~~is operated~~ as a vacuum pump, where the pumping chamber (26) is being operated free of lubricants and ~~where~~ the crank drive (13) guides guiding the displacer (18) such that it circulates in a non-contact manner within the cylinder (2).

38. (Currently Amended) The mMethod according to claim 37 wherein the pump (1) is operated with inner compression.

39. (Currently Amended) ~~Method~~ The method according to claim 37, wherein of ~~38 with a pump (1) the displacer (18) of which exhibits~~ includes a hollow space (20) ~~wherein, the method further comprising: maintaining~~ a low pressure is ~~maintained~~ in the displacer (18).

40. (Currently Amended) Method ~~The method~~ according to claim 37, ~~wherein of~~
~~38 with a pump (1)~~ the displacer includes (18) ~~of which exhibits~~ a hollow
space (20), the method further comprising: wherein flowing cooling air or
ballast gas ~~flows~~ through the hollow space (20) of the displacer (18).